# Improved Neutron Fluence Spectra for Simulations of the Role of the Isomer of U-235

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The fission cross section for the isomer of $^{235}$U is predicted to be significantly lower that that for the ground state at neutron energies below 0.5 MeV. At these same neutron energies the neutron capture cross section is enhanced (see Fig. 1). An accurate determination of the role of this isomer in weapons simulations requires an accurate determination of the neutron fluence at these low energies.

For this purpose we carried out detailed 2-dimensional simulations for a dominantly $^{235}$U device using Monte Carlo transport of the neutronics. We found that the Monte Carlo treatment provided a significant improvement in the predicted low-energy neutron spectrum over other methods, mainly because of the improved treatment of neutron down-scattering processes. We determined the effect of including the isomer of $^{235}$U in the simulations on the yield and on the production of $^{236}$U.

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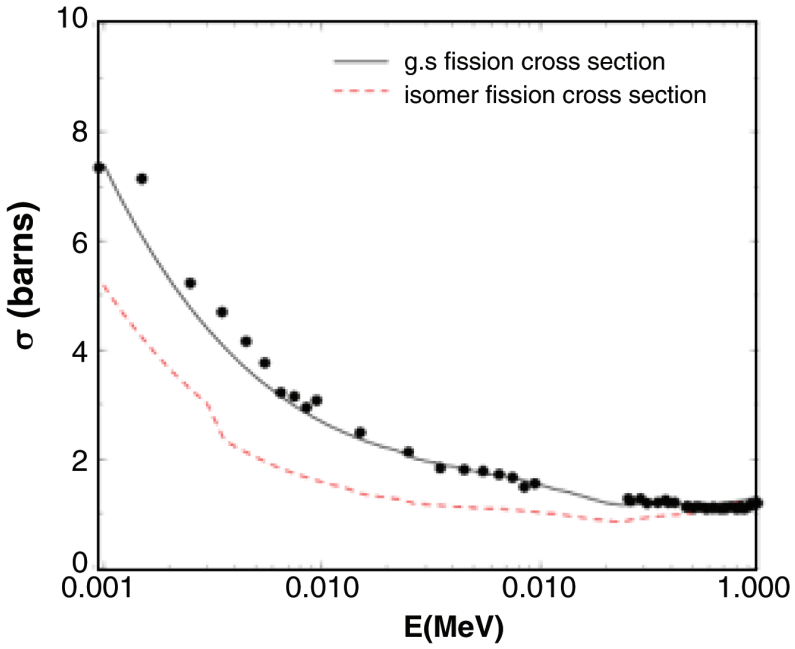


**Fig. 1.**
*Fission cross section for $^{235}U$. The black (line and dots) are for the ground state, and the red line is for the isomer.*